Decomposition and nutrient release patterns of manure from sheep fed with different tree/shrub species in the Sudano-Sahelian zone of Burkina Faso, West Africa

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Introduction

In West Africa's open-parkland systems, farmers apply animal manure (Fig. 1) to improve soil fertility and sustain crop production.

→ **We studied decomposition and nutrient release of manure from sheep fed leafs of common woody species in the Sudano-Sahelian zone of Burkina Faso.**

Fig. 1. Field application of leaf-derived manure in Burkina Faso

Materials and Methods

Study site: Saria, Burkina Faso.

Treatments: Sheep manure derivatives from ***Bombax*** *costatum* ***Ficus*** *sycomorus,* ***Khaya*** *senegalensis,* and from bush **straw**.

Litterbag technique: 20 × 20 cm² nylon bag with 2 mm mesh size (Fig. 2). Each litterbag filled with 17 g of dry manure(DM)

Sampling time: 2, 4, 8, 16 and 32 weeks after bag burial.

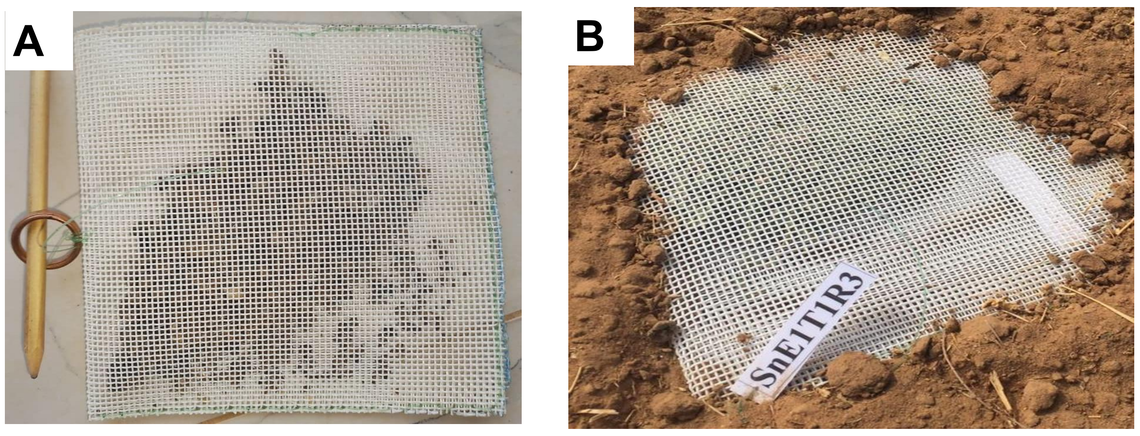

Fig. 2. Leaf-derived sheep manure in litterbag (**A**) and buried litterbag (**B**)

Results

- Initial nitrogen (N) concentration of bush straw and *Ficus* manure was 18% lower (p<0.05) than that of *Bombax* manure (Tab. 1).
- Phosphorus (P) concentration in *Ficus* manure was 2-fold higher (p<0.05) than in the other manures.

Tab 1. Initial chemical composition (mg g^{-1}) of manure from sheep fed with different tree/shrub leaves and straw

Manure type	N	P	K	C/N
B. costatum	13.8^{a}	2.8^{a}	2.1^{bc}	31.9^{b}
F. sycomorus	11.0^{c}	11.0^{c}	1.4^{c}	26.8^{c}
K. senegalensis	12.4^{b}	2.5^{ab}	2.3^{b}	30.7^{b}
Bush straw	11.3^{c}	2.8^{a}	4.6^{a}	37.8^{a}

Different lowercase letters near means display statistical difference at p<0.05.

- Until week 4, DM loss from straw-derived manure was 97% and 46% higher (p<0.05) than from leaf-derived manures (Fig. 3).
- N release from straw-derived manure until 16 weeks was higher (p<0.05) than that of the other manures (Fig. 4A).
- Until week 8, P release from *Bombax* and *Ficus* was 47% and 50% lower (p<0.05) than from straw and *Khaya* (Fig. 4B).
- Until week 8, K release from straw and *Khaya* was 1.7- and 1.4-fold higher (p<0.01) than from *Bombax* and *Ficus* (Fig. 4C).

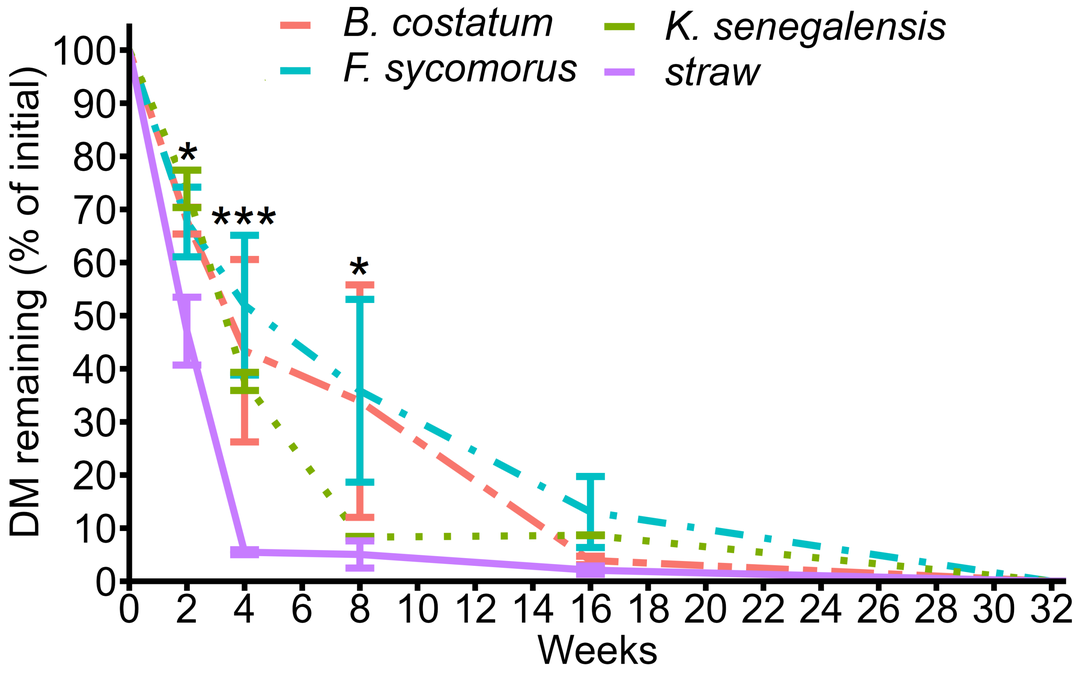

Fig. 3. Decay patterns of manure from straw and leaf-fed sheep

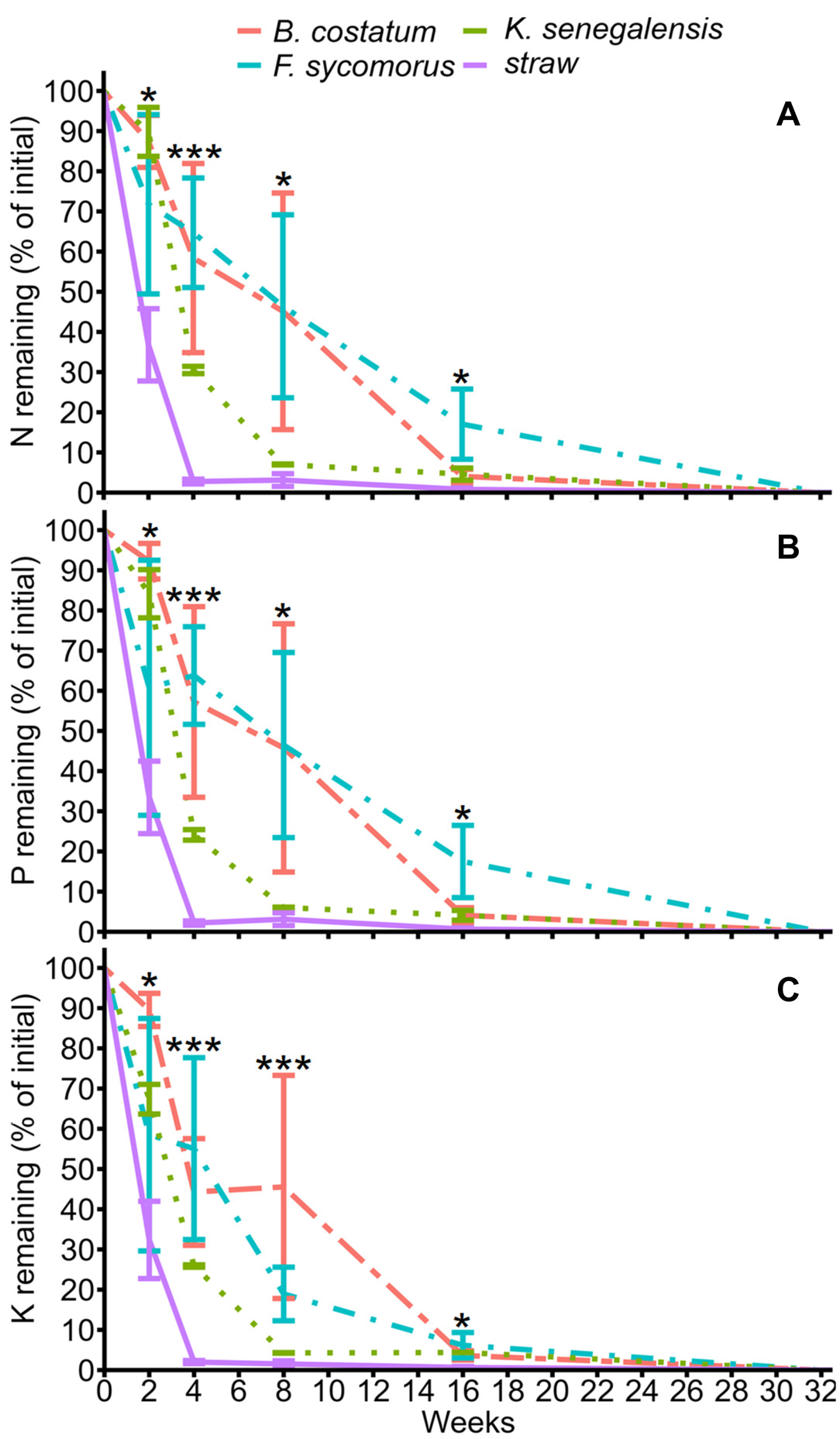

Fig. 4. Nitrogen (**A**), P (**B**) and K (**C**) release from manure of sheep fed straw or leaves of woody species

Conclusions

- The quick nutrient release from straw- and *Khaya senegalensis*- based manure benefits fast crop growth provided that leaching is limited.
- Manures derived from *Bombax costatum* and *Ficus sycomorus* are suited to improve longer-term soil fertility.

DAAD Deutscher Akademischer Austauschdienst German Academic Exchange Service

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